SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the effect of Solubility, Saturation, Supersaturation and Induction Time in crystal growth.

17. Explain the floating zone method of crystal growth detail.

18. Discuss in detail about Pauling's rule and the defects in the crystals.

19. Justify the working and advantages and disadvantages of Chemical Bath Deposition technique.

20. Distinguish between the Scanning Electron Microscopy and Transmission Electron Microscopy and tell the applications of it.

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APRIL/MAY 2025

GEPH42A/DEPH42A — CRYSTAL GROWTH AND THIN FILMS

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. List main features of the classical theory of nucleation?

2. Write about the significance of Temkin's model.

3. How does Bridgman technique and Czochralski method differ?

4. Expand PVD, MBE, LPE, CVD.

5. Explain in two lines about the translational symmetry in crystals.

6. Classify the defects in crystals.

7. Why the Sol-Gel method is preferred over other techniques for nanomaterials preparation.

8. What is meant by sputtering?

9. Give the principle of X-ray diffraction.

10. How does AFM work?

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions.

11. (a) Write a note on Kinetic Theory of nucleation.

Or

(b) Distinguish between spherical, cap, cylindrical and orthorhombic shapes of nuclei.

12. (a) Discuss the process of Verneuil technique with a neat sketch.

Or

(b) Name the different techniques used for epitaxial growth and explain any one of them in detail.

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13. (a) Write a note on

(i) Point Group and

(ii) Space group.

Or

(b) Briefly explain about Polymorphism and twinning in crystals.

14. (a) Explain Reactive sputtering and Radio frequency sputtering method for then film deposition.

Or

(b) Enumerate the role of thin film in devices.

15. (a) With a block diagram explain the working of IR spectroscopy.

Or

(b) Assess the importance of Luminescence studies in characterizing the materials.